

## Areas Between Curves

State the area  $A$  of the region bounded by the curves  $y = f(x)$  and the lines  $x = a, x = b$  where  $f$  and  $g$  are continuous and  $f(x) \geq g(x)$  for all  $x$  in  $[a, b]$ . Sketch an illustration.

The above definition assumes that  $f(x) \geq g(x)$  on the whole interval. What do you do if  $f(x) \geq g(x)$  for some values of  $x$  on  $[a, b]$  and  $f(x) \leq g(x)$  for other values of  $x$  on  $[a, b]$ ?

How do you find the bounds of integration when finding the area between curves???

What is the substitution rule for definite integrals? What does that mean?

Sometimes it is easier to find the area between curves by switching your functions that are in terms of  $x$  to functions in terms of  $y$ . Can you restate the definition of area above in terms of this switch?

Find the area between the curves below. Sketch the graphs!

1.  $y = x^2$ ,  $y = 4x - x^2$

2.  $y = \sqrt{x-1}$ ,  $x - y = 1$

3.  $y = |x|$ ,  $y = x^2 - 2$